University of Technology, Sydney

Faculty of Science

Department of Environmental Sciences

Population ecology of the Australian White Ibis, *Threskiornis molucca,* in the urban environment.

Andrew Charles Michael Smith

BSc (University of Technology, Sydney)

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Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy

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PhD Thesis

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Abstract

The Australian White Ibis (*Threskiornis molucca*) has dramatically increased in many coastal urban environments, while it has decreased in large areas of its traditional environment range in inland Australia since the 1970s. Ibis are often viewed as pests in urban environments due to the social, economical and environmental problems they can cause. Current, management of ibis in the urban environment predominately focuses on restricting their breeding success, in order to reduce abundances. Management can be costly, labour intensive and limited in its success, due to a lack of detailed knowledge of the ecology of urban ibis. The focus of this thesis is to explore various ecological parameters of urban ibis to increase the effectiveness of their management. Three major breeding/roosting colonies of ibis were monitored weekly for a whole year (2005 to 2006). In addition, five major landfills for domestic waste were investigated for avian abundances and diversity. My main aims were to provide details on the reproductive biology, population dynamics, local and regional movements and the use of landfills by ibis. In comparison to non-urban ibis, urban ibis have a longer breeding period, smaller mean egg volumes and clutch sizes, but a larger range of clutch sizes. They also have a lower hatching success, but higher reproductive success and a higher mean number of fledglings per clutch. Each roosting/breeding and landfill site differed in their reproductive success and/or population dynamics. Ibis used multiple sites for breeding and feeding and were capable of moving over vast distances after they had fledged. The ability of ibis to obtain food from anthropogenic sources appears to be one of the key factors in the urban environment that allows them to survive and breed there. Management plans need to consider this and their decline in their traditional environments to be effective, without harming the overall survival of this native species.

Student declaration

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Andrew Charles Michael Smith

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Publications (originating from this study)

Papers:

- Smith, A. C. M., and Munro, U. (2008). Cannibalism in the Australian Pelican (*Pelecanus conspicillatus*) and Australian White Ibis (*Threskiornis molucca*). *Waterbirds* **31**, 632-635.
- Smith, A. C. M., and Munro, U. (2010). Seasonal population dynamics of the Australian White Ibis (*Threskiornis molucca*) in urban environments. *Emu* (in press)

Conferences:

- Smith, A.C.M., Corben, D.T., Ross, G., and Munro, U. (2006). The Australia White Ibis – our vulnerable urban pest? *Biodiversity Extinction Crisis Conference,* Sydney, March.
- Smith, A.C.M., Ross, G., and Munro, U. (2007). Breeding success, movements and management of the Australian White Ibis, *Threskiornis molucca*. *Australasian Ornithological Conference,* Perth. December.
- Smith, A.C.M., and Munro, U. (2009). The Australian White Ibis: ecology of an urban waterbird. *Birds and Water – Birds Australia Southern NSW & ACT Seminar,* Sydney, April (by invitation).
- Smith, A.C.M., and Munro, U. (2009). Population ecology of the Australian White Ibis, *Threskiornis molucca,* in an urban environment. *10th International Congress of Ecology*, Brisbane, August, and *Australasian Ornithological Conference,* Armidale, December.
- Smith, A.C.M., and Munro, U. (2009). Food for thought: urban landfills, not a wasteland for some of Australia's birds. *Australasian Ornithological Conference,* Armidale, December.

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Thesis structure

This thesis includes seven chapters. The first chapter provides background information on the ecology of the Australian White Ibis (*Threskiornis molucca*), identifies gaps in knowledge, and states the significance and aims of this thesis. The next five chapters (data chapters) have been prepared as manuscripts for submission to peer-reviewed journals. Formatting may vary between these chapters and depend on the relevant editorial and other requirements of the journal the manuscript will be submitted to. This means that there exists some overlap and repetition in particular in the methodology and background information of ibis in these chapters. The final chapter summarises the main conclusions from each data chapter, details major findings and their implications, and suggests directions for further research. References are provided for every chapter.

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